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SOUTHERN FOREST EXPERIMENT STATION

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New Orleans, La.

PULPING AND NONPULPING CORDWOOD VOLUME IN THE LONGLEAF PINE REGION OF MISSISSIPPI & EAST LOUISIANA

By

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* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

FOREWORD

The nation-wide Forest Survey, being made by the United States Forest Service, was authorized by the McSweeney-McNary Forest Research Act of 1928. Its five-fold object is: (1) to make an inventory of the present supply of timber and other forest products, (2) to ascertain the rate at which this supply is being increased through growth, (3) to determine the rate at which this supply is being diminished through industrial and local use, windfall, fire, and disease, (4) to determine the present requirement and the probable future trend in the requirement for timber and other forest products, and (5) to correlate these findings with existing and anticipated economic conditions in order that policies can be formulated for the effective use of land suitable for forest production.

In the South, the Forest Survey functions as an activity of the Southern Forest Experiment Station at New Orleans, La.

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PULPING AND NONPULPING CORDWOOD VOLUME IN THE LONGLEAF PINE REGION OF MISSISSIPPI & EAST LOUISIANA

The longleaf pine region of Mississippi and east Louisiana, as shown on the map (Fig. 1, page 5), extends eastward and northward from Lake Pontchartrain, and includes five parishes in Louisiana and seventeen counties in southeastern Mississippi. The Louisiana portion of the area comprises Forest Survey Unit #4 in Louisiana, the Mississippi portion Unit #4 in Mississippi.

In the southern part along the tidewater the terrain is marked by marshy, sea-level lowlands, and sandy flatwoods. These merge into rolling uplands that become higher and more broken toward the north, where elevations of four to five hundred feet are common. Gently rolling to moderately hilly uplands characterize the topography in 68 percent of the area; flatwoods occupy 11 percent; and swamps, bays, ponds, and river bottoms the remainder. The Pearl, Pascagoula, and Amite Rivers, and numerous lesser streams flowing southward, furnish adequate drainage for the area.

Only a small part of the region is in agricultural use; by far the greatest part is forest land, most of it second-growth. Approximately 500,000 acres have been acquired or are in course of acquisition within federal forest purchase areas.

There are five major trunk line railroads operating in the area: the Louisville and Nashville; the Southern; the Illinois Central; the Gulf, Mobile, and Northern; and the Mobile and Ohio. Four or five smaller railroads also traverse parts of the region, and there are numerous hard-surfaced and gravelled highways. Probably less than 5 percent of the area lies more than 10 miles from railroads or improved roads. New Orleans, Gulfport, and Mobile, which have deep water shipping facilities, are connected by rail and highway with all parts of the area and are within 250 miles travel of any part of it.

The information presented in this release is based on data that the Forest Survey gathered between August, 1934 and March, 1935. Specially trained timber cruisers measured the timber and recorded the forest and land-use conditions on more than 10,000 quarter-acre plots systematically located at intervals of 660 feet on parallel compass lines 10 miles apart. The preliminary estimates presented here are subject to correction or modification as analyses proceed. Such changes, if necessary, however, will probably be neither extensive nor basic.

The Forest Survey is not attempting in this release to analyze the extent to which the wood volume of the area should be used for pulp. In such an analysis it would have to consider the prior claims of other forest industries, and the building up of an ample growing stock to safeguard the future timber supply. The Survey has gathered data on the growth, use, and industrial aspects of the forests in the region. In interpreting these data it will attempt to determine the relative volumes of pulpwood, sawtimber, and other forest products that the area can perpetually produce, and will publish such findings as it makes as part of a more comprehensive report.

LAND AREA

Table 1 classifies the total area of 8 million acres in the region by major classes of land use. The forest area of nearly 6½ million acres makes up by far the most extensive part of the region, including nearly 80 percent of the total acreage. In contrast, only 18 percent, or less than 1½ million acres, are cleared for agricultural use.

TABLE 1. -- *Area*[1] *classified by major land uses*

Land-use classes	Area in acres	Percent of total area
Forest	6,414,700	79.4
Agricultural:		
In cultivation:		
Old cropland[2]	1,152,200	14.3
New cropland[3]	19,100	.2
Out of cultivation:		
Idle[4]	85,600	1.1
Abandoned[5]	92,100	1.1
Improved pasture[6]	72,000	.9
Total agricultural	1,421,000	17.6
Other:		
Marsh, Waterways, Towns and villages, Roads, railroads, etc.	245,600	3.0
Total area	8,081,300	100.0

[1] Does not include meanderable water area.

[2] Land cultivated more than five years and on which a farm crop was raised within two years prior to date of survey.

[3] Land converted from forest to cropland within five years prior to date of survey.

[4] Cultivated land that has been idle for two years or more, but has not reached the abandoned stage.

[5] Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt has been made to maintain it as improved pasture.

[6] Cleared or open land under fence used primarily for grazing; an attempt has been made to maintain a sod.

In the presentation of these survey data, it is to be noted that owing to the sampling method used in collecting them, usually the greater the number of plots recorded in any given classification the more accurate are the data for that classification. Hence classes that are of infrequent occurrence and relatively small in quantity cannot generally be determined with as high a degree of accuracy as is ob-

tainable for classes that occur more frequently and in substantially greater quantities. Small tabular figures are to be taken as showing, not the exact magnitude of the classes involved, but their relative magnitude in comparison with that of other classes.

FOREST AREA

Table 2 classifies the forest area of nearly 6½ million acres by forest conditions and forest type groups. The forest type groups are designated in the table by their predominant species. Forest conditions are defined as follows:

Old growth: Stands composed predominantly of saw-log-size trees that have the characteristics of the original mature trees found in the region. ("Saw-log-size" signifies a minimum diameter of 13.0 inches outside of bark at breast height in the hardwood species, 9.0 inches in the pine species).

Uncut: Old-growth stands from which less than 10 percent of the volume has been cut.

Partly-cut: Old-growth stands from which 10 percent or more of the volume has been cut but in which the remaining volume per acre in old-growth saw-log-size trees is at the rate of at least 1,000 board feet of hardwood or hardwood and pine mixed, or 600 board feet of pine.

Second growth: Stands that have succeeded the original old growth as a result of forest cutting or other causes.

Saw-log size:
Uncut: Second-growth stands from which less than 10 percent of the saw-log-size trees have been cut, and in which the remaining volume per acre in saw-log-size trees is at the rate of at least 600 board feet.

Partly-cut: Second-growth stands from which 10 percent or more of the saw-log-size trees have been cut, but in which the remaining volume per acre in saw-log-size trees is at the rate of at least 400 board feet.

Under saw-log size:
Uncut: Second-growth stands composed predominantly of under saw-log-size trees, less than 10 percent of which have been cut. The volume of saw-log-size timber present is at the rate of less than 600 board feet per acre.

Partly-cut: Second-growth stands composed predominantly of under saw-log-size trees, 10 percent or more of which have been cut. The volume of saw-log-size timber present is at the rate of less than 600 board feet per acre.

Reproduction: Areas not falling into any of the previous classifications, and bearing seedlings less than one inch in diameter at the rate of 80 or more per acre.

Clear-cut: Cut-over areas in which an insufficient quantity of young growth has come in to classify them either as second growth or as reproduction.

Table 2 indicates that over 60 percent of the forest area supports second growth, 12 percent is stocked with young seedlings, and 14 percent is clear-cut area not yet restocked. Only 13 percent of the forest area is old growth, and most of this is partly-cut.

Although the longleaf and slash pine types actually occupy but 53 percent of the forest area, they predominate throughout approximately two-thirds of the region. (See map, page 5)

TABLE 2. -- *Forest area by forest conditions and forest type groups*

Forest conditions	Forest type groups designated by predominant species			Total	Percent of total forest area
	Longleaf and slash pine	Loblolly and shortleaf pine	Hardwood		
	---------- *Acres* ----------				
Old growth:					
Uncut	43,300	28,400	157,000	228,700	3.6
Partly-cut	228,900	77,300	286,900	593,100	9.2
Total old growth	272,200	105,700	443,900	821,800	12.8
Second growth:					
Saw-log size:					
Uncut	322,200	746,900	196,200	1,265,300	19.7
Partly-cut	106,100	130,400	42,100	278,600	4.3
Under saw-log size:					
Uncut	1,168,800	629,100	505,800	2,303,700	35.9
Partly-cut	41,700	24,900	20,200	86,800	1.4
Total second growth	1,638,800	1,531,300	764,300	3,934,400	61.3
Reproduction	632,400	60,100	64,400	756,900	11.8
Clear-cut	865,700	23,400	12,500	901,600	14.1
Total all conditions	3,409,100	1,720,500	1,285,100	6,414,700	100.0
Percent of total forest area	53.2	26.8	20.0	100.0	

MAJOR FOREST TYPES
IN THE LONGLEAF PINE REGION OF
MISSISSIPPI & EAST LOUISIANA
STATUTE MILES
LOCATION OF SURVEY AREA
IN MISSISSIPPI & LOUISIANA.
FOREST TYPES
LONGLEAF-SLASH
LOBLOLLY-SHORTLEAF-HDWDS.
BOTTOMLAND HDWD.& CYPRESS
MARSH
COVINGTON
JONES
WAYNE
JEFFERSON DAVIS
LAWRENCE
MARION
WALTHALL
GREENE
WASHINGTON
PEARL RIVER
STONE
GEORGE
ST. HELENA
TANGIPAHOA
LIVINGSTON
ST. TAMMANY
HANCOCK
HARRISON
JACKSON
ST. JOHN THE BAPTIST
ST. JAMES
ST. CHARLES
ST. BERNARD
LAKE PONTCHARTRAIN
LAKE BORGNE
MISSISSIPPI SOUND
GULF OF MEXICO
SOUTHERN FOREST EXPERIMENT STATION - NEW ORLEANS, LA.

FIGURE 1.

VOLUME ESTIMATE

Table 3 classifies the cordwood estimate for the area by forest type groups and by tree species groups and diameter classes. The forest type groups are designated in the table by their predominant species. The tree species groups are as follows:

Turpentine pines:	Longleaf and slash pine, the two species that are worked for turpentine.
Nonturpentine pines:	Loblolly, shortleaf, and spruce pines---species not worked for turpentine.
Pulping hardwoods:	Gum, bay, poplar, maple, magnolia, and associated minor species---generally considered of value for the production of paper pulp.
Nonpulping hardwoods:	Cypress, oak, hickory, beech, ash, elm, hackberry, and associated minor species---not generally considered of value for the production of paper pulp.

This volume estimate is based upon a conversion of the cubic-foot volume of the timber (including bark) into standard cords 4 x 4 x 8 feet, by using a factor of 90 cubic feet for pine and 80 cubic feet for hardwood. It covers all live trees 5.0 inches or over in diameter, except sound and rotten culls, and includes only the stemwood down to a 4.0 inch diameter limit for the pines and to the top of the last saw-log for the hardwoods. This estimate, therefore, disregards altogether the sound and rotten culls, the sound trees less than 5.0 inches in diameter, all limbwood, and the stemwood less than 4.0 inches in diameter in the pines and above the last saw-log in the hardwoods. No deduction was made for woods cull -- that part of the tree that would be left in the woods because of rot, fire-scar, crook, bad knots, or other defects. (The diameter measurement of the trees was taken 4½ feet from the ground, except on the turpentined trees, on which it was taken 10 feet from the ground.)

Table 3 indicates that 80 percent of the total volume is in pulping species: 17 percent in the turpentine pines, 30 percent in the nonturpentine pines, and 33 percent in the pulping hardwoods.

Three-fourths of the turpentine pine volume shown is in trees that have never been worked. By far the greater part of the longleaf and slash pine volume, therefore, is in trees with additional turpentining possibilities. Although fewer turpentine operations are carried on in this region than in areas farther east, the area is within the active naval stores belt and is subject to more extensive naval stores utilization.

TABLE 3. -- *Cordwood volume of pulping and nonpulping species*

Tree species groups	Tree diameter classes[1]	Forest type groups designated by predominant species			Total	Percent of total volume
		Longleaf and slash pine	Loblolly and shortleaf pine	Hardwood		
	Inches	---------- *Thousands of cords*[2] ----------				
Pulping Species:						
Turpentine pines:	6 - 8	1,877	98	13	1,988	4.3
	10 - 12	2,745	145	29	2,919	6.3
	14 - 18	2,067	108	10	2,185	4.7
	20 & over	819	31	7	857	1.8
Total turpentine pines		7,508	382	59	7,949	17.1
Nonturpentine pines:	6 - 8	160	3,115	202	3,477	7.5
	10 - 12	203	4,045	142	4,390	9.5
	14 - 18	126	4,057	136	4,319	9.3
	20 & over	18	1,474	38	1,530	3.3
Total nonturpentine pines		507	12,691	518	13,716	29.6
Total pines		8,015	13,073	577	21,665	46.7
Hardwoods:	6 - 8	753	1,106	1,595	3,454	7.4
	10 - 12	925	1,612	2,347	4,884	10.5
	14 - 18	408	1,112	2,956	4,476	9.7
	20 & over	91	376	2,172	2,639	5.7
Total pulping hardwoods		2,177	4,206	9,070	15,453	33.3
Total pulping species		10,192	17,279	9,647	37,118	80.0
Nonpulping Species:						
Hardwoods:	6 - 8	675	1,137	1,155	2,967	6.4
	10 - 12	314	903	1,141	2,358	5.1
	14 - 18	181	670	1,344	2,195	4.7
	20 & over	35	299	1,400	1,734	3.8
Total nonpulping species		1,205	3,009	5,040	9,254	20.0
Total all species		11,397	20,288	14,687	46,372	100.0
Percent of total volume		24.6	43.7	31.7	100.0	

[1] Diameter measurement of trees taken outside of bark 4½ feet from the ground, except on the turpentined pines, on which it was taken 10 feet from the ground. Trees ranging from 5.0 to 8.9 inches in diameter placed in the 6-8 inch class; corresponding limits apply to the other classes.

[2] To convert to full number of cords add "000".

The cordwood volume on the average acre of forest land is classified in Table 4 by tree species groups and diameter classes. This average acre volume is a theoretical figure derived by dividing the total cordwood volume in each species group and tree diameter class (as given in Table 3) by the forest acreage (as given in Table 2). Table 4 indicates that there is an average of approximately 7¼ cords of wood per acre in the forests of this area, over 5¾ cords in pulping species and nearly 1½ cords in nonpulping species. The trees in the 6 and 8 inch classes contain nearly 2 cords of wood per acre, and those in the 10 and 12 inch classes over 2¼ cords.

TABLE 4. -- *Cordwood volume of pulping and nonpulping species on the average acre of forest land*

Tree species groups	Tree diameter classes in inches				Total all diameter classes
	6 - 8	10 - 12	14 - 18	20 & over	
	Cords				
Pulping species:					
Turpentine pines	.31	.46	.34	.13	1.24
Nonturpentine pines	.54	.68	.68	.24	2.14
Total pines	.85	1.14	1.02	.37	3.38
Hardwoods	.54	.76	.70	.41	2.41
Total pulping species	1.39	1.90	1.72	.78	5.79
Nonpulping species:					
Hardwoods	.46	.37	.34	.27	1.44
Total all species	1.85	2.27	2.06	1.05	7.23

SUMMARY

The longleaf pine region of Mississippi and east Louisiana contains an area of 8 million acres. Its topography, for the most part rolling, varies from low marshes and sandy flatwoods in the southern part to rolling uplands four to five hundred feet high in the northern part. Approximately 80 percent of the area is forest land, over 60 percent of which bears second-growth timber, and 12 percent reproduction. Eighty percent of the forest area supports pine types.

The total wood volume estimated for the region is 46 million cords. Eighty percent is in pulping species, both pine and hardwood, and 20 percent is in nonpulping hardwoods. Longleaf and slash, the two turpentine pines, contain more than one-fifth of the volume in pulping species. On the average the forests in the region bear 7¼ cords of wood per acre.

Plans for future wood pulp operations in the area should consider the integration of the wood pulp industry with the naval stores, lumber, and other wood-using industries. Pulpmills located at Mobile, Ala., Mosspoint and Laurel, Miss., and Bogalusa, Louisiana, with an aggregate annual capacity of 440,000 cords, are now drawing about half of their material from the resources in this area.

The estimate of the cordwood volume in the region, by tree species groups and diameter classes (Table 3, page 7), is presented graphically in Figure 2.

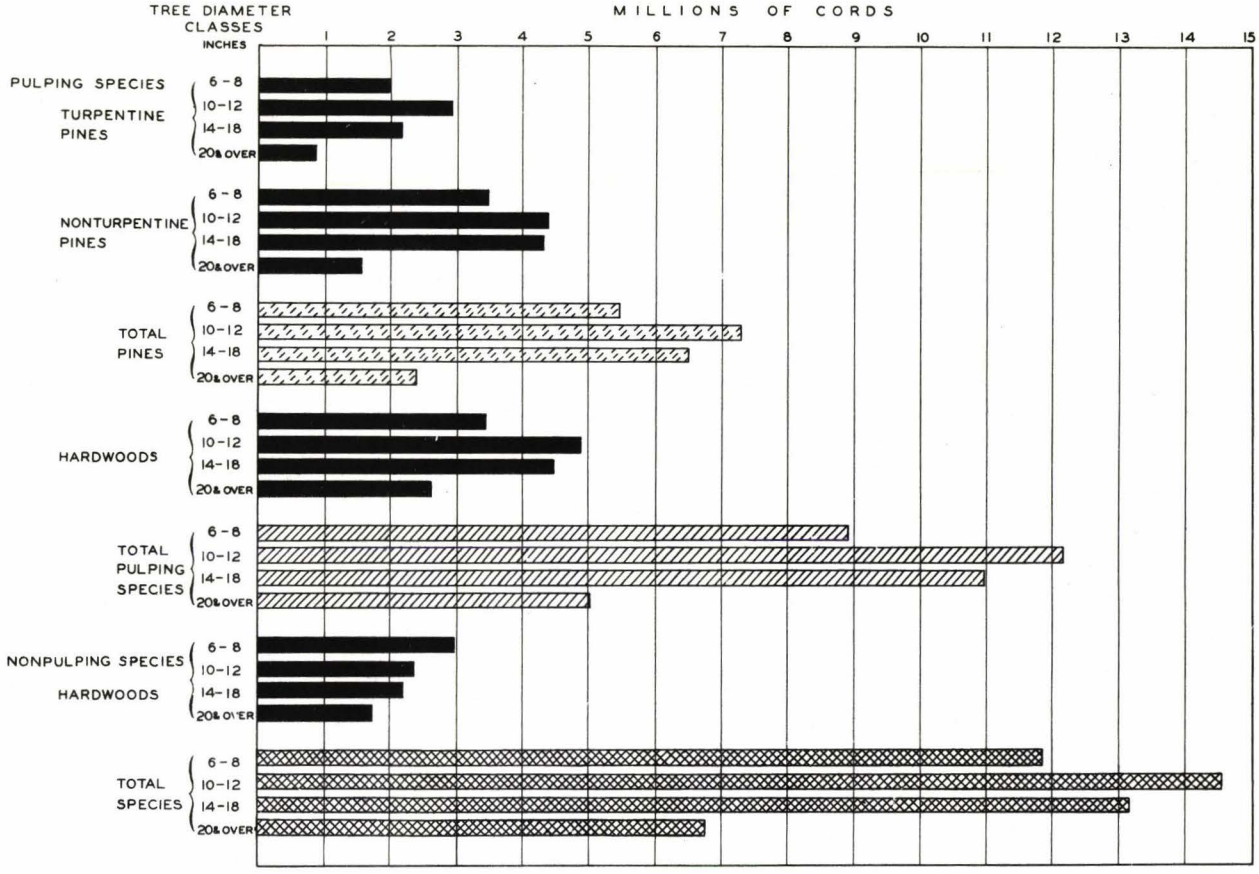

FIG. 2 - CORDWOOD VOLUME OF PULPING AND NONPULPING SPECIES. (SEE TABLE 3, PAGE 7)